5 What are the Regulatory Bases for Effluent Limitations Guidelines and Standards for Subparts B and E?

EPA established numerical ELGs and pretreatment standards for Subparts B and E based on model process technologies and wastewater treatment technologies. Although you must apply the ELGs in the NPDES permit or pretreatment control agreement, mills with operations in Subpart B and E are not required to implement the specific process and/or technologies upon which they are based. Mill owners and operators may use any combination of process technologies and in-process or end-of-pipe wastewater treatment technologies to comply with the permit limits.

What are the Model Process Technologies and Treatment Systems?

This section outlines the model technologies that form the regulatory bases of the ELG&S presented in Section 4. This discussion is broken out by subpart.

Subpart B - Bleached Papergrade and Kraft and Soda Mills

For direct dischargers, the model technology basis of BAT for the Bleached Papergrade Kraft and Soda Subcategory is conventional pulping followed by complete substitution of chlorine dioxide for elemental chlorine, as well as the nine elements identified below:

1. Adequate chip thickness control;

2. Closed brown stock pulp screen room operation (i.e., screening filtrates are returned to the recovery cycle);

3. Effective brown stock washing (i.e., washing that achieves a soda loss of less than or equal to 10 kg Na_2SO_4 per air dried metric ton (ADMT) of pulp (equivalent to 99% recovery of pulping chemicals from the pulp);

4. Use of TCDD- and TCDF-precursor-free defoamers (water-based defoamers or defoamers made with precursor-free oils);

5. Elimination of hypochlorite (i.e., replacing hypochlorite with equivalent bleaching power, such as adding peroxide and/or oxygen to the first extraction stage and/or additional chlorine dioxide in final brightening stages);

6. Use of strategies to minimize kappa factor and TCDD- and TCDF-precursors in brown stock pulp;

7. High-shear mixing to ensure adequate mixing of pulp and bleaching chemicals;

8. Oxygen and peroxide enhanced extraction, which allows mills to eliminate hypochlorite and/or use a lower kappa factor in the first bleaching stage; and

9. Efficient biological wastewater treatment, removing 90% or more of influent five-day biochemical oxygen demand (BOD_5).

The technology basis of NSPS is equivalent to that of BAT with the addition of extended delignification (oxygen delignification and/or extended cooking). For the purpose of estimating effluent pollutant reductions, EPA defines extended delignification as the operation of such equipment to a kappa number of 20 or less for softwoods and less than 13 for hardwoods.

For indirect dischargers, the technology bases of PSES and PSNS are equivalent to that of BAT and NSPS technologies, respectively, except without efficient biological wastewater treatment. POTWs are expected to perform efficient biological wastewater treatment.

Subpart E - Papergrade Sulfite Mills

As discussed in Section 3, EPA reorganized Subpart E for BAT, PSES, NSPS, and PSNS into the following three segments:

- **Calcium-, magnesium-, or sodium-based sulfite segment:** Papergrade sulfite mills where pulp and paper are produced using calcium, magnesium, or sodium sulfite acidic cooking liquors, unless those mills are specialty-grade sulfite mills.

- **Ammonium-based sulfite segment:** Papergrade sulfite mills where pulp and paper are produced using an ammonium sulfite acidic liquor, unless those mills are specialty-grade sulfite mills.

- **Specialty-grade sulfite segment:** Papergrade sulfite mills that produce at least 25% pulp with a high percentage of alpha cellulose and high enough brightness to produce end products such as plastic molding compounds, saturating and laminating products, and photographic papers. The specialty-grade segment also includes mills that produce most of their pulp at 91 ISO brightness and above.

For each papergrade sulfite segment, BAT and NSPS are equivalent. Table 5-1 presents the technology bases for BAT and NSPS for each segment of the Papergrade Sulfite Subcategory.

Table 5-1: BAT and NSPS Technology Bases for Papergrade Sulfite Subcategory

Technology Basis for:		
Calcium-, Magnesium-, and Sodium-Based Segment is:	**Ammonium Sulfite Segment is:**	**Specialty-Grade Sulfite Segment is:**
1. Totally chlorine-free bleaching (bleaching with peroxide);	1. Complete substitution of chlorine dioxide for chlorine;	1. Complete substitution of chlorine dioxide for chlorine;
2. Use of TCDD- and TCDF-precursor-free defoamers (water-based defoamers or defoamers made with precursor-free oils);	2. For mills with ECF bleaching, elimination of hypochlorite (i.e., replacing hypochlorite with equivalent bleaching power, such as adding peroxide to the first extraction stage and/or additional chlorine dioxide in final brightening stages);	2. For mills with ECF bleaching, elimination of hypochlorite (i.e., replacing hypochlorite with equivalent bleaching power, such as adding peroxide and/or oxygen to the first extraction stage and/or additional chlorine dioxide in final brightening stages);
3. Oxygen and peroxide enhanced extraction;	3. Use of TCDD- and TCDF-precursor-free defoamers (water-based defoamers or defoamers made with precursor-free oils);	3. Use of TCDD- and TCDF-precursor-free defoamers (water-based defoamers or defoamers made with precursor-free oils);
4. Improved pulp cleaning; and	4. Peroxide enhanced extraction;	4. Oxygen and peroxide enhanced extraction;
5. Efficient biological wastewater treatment.	5. High-shear mixing; and	5. High-shear mixing; and
	6. Efficient biological wastewater treatment.	6. Efficient biological wastewater treatment.

The technology bases of PSES and PSNS for each segment include all the model BAT and NSPS technologies except for efficient biological wastewater treatment, because POTWs are expected to perform efficient biological wastewater treatment.

For a complete description of each technology element, refer to the *Supplemental Technical Development Document for the Pulp, Paper, and Paperboard Category Effluent Limitations Guidelines and Standards, and New Source Performance Standards* (EPA-821-R-97-011, October 1997, www.epa.gov/ost/pupppaper/jd/stdd-v4.pdf).